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INVESTIGATION OF THIRD ORDER NONLINEAR CONTROL SYSTEMS

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Mr. T. Ishikawa, the graduate student participating in this research work, returned on July 1 from his trip to Japan (see last report).

Since the operation of the control system in the after-endpoint chatter region (region of controlled chatter) is considered most efficient, the region of the phase space in which endpoints occur has been determined for all types of third order systems.

Most of the time was devoted to obtaining simple formulas for the frequency and the peak to peak error in the region of controlled chatter. At an earlier date (see status report 3) a graphical method was employed, however, we judge that analytic expressions are preferable for practical use. We spent some time in studying Pestel's paper in which the periodic controlled chatter motion is investigated with the help of the describing function of the imperfect relay. His method involves simple, but lengthy computations.

Our new computation is based on the representation of the space trajectory by a polynomial in time τ.